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Brief Summary Text (26):

Preferably, the adjust used to regulate the auto-repeat delay and rate constitutes two touch-sensitive, calibrated line scales, one for each. These scales permit a user to change the associated rates with ease. The user simply touches any point along the scale above or below a set point indicating the previously set rate. The computer "reads" the touched point, and modifies the previous rate accordingly. With this arrangement, a user can customize the "feel" of keystrokes on the simulated keyboard, with a view toward improving typing efficiency.

Detailed Description Text (4):

More specifically, the touch screen 24 in a preferred embodiment is a glass plate coated on its touch-sensitive side 24a (i.e., the side facing away from the output screen 28) with a resistive material, and then covered on that side with a Mylar contact sheet (not separately shown). The contact sheet is maintained at a small, substantially-uniform distance from the touch-sensitive side of the glass plate. Pressure exerted on the contact sheet by a finger, stylus or other object, (herein called a "touch") causes the contact sheet to make electrical contact with the resistive coating.

Detailed Description Text (5):

In use, the touch screen controller 18 impresses a voltage gradient across the resistive coating alternately in the "x" (i.e., horizontal) and "y" (i.e., vertical) directions. By establishing a voltage divider circuit, the touch produces voltage signals detectable by the touch screen controller 18 which are representative of the average Cartesian coordinates in the x- and y- directions of the touched area of the screen.

Detailed Description Text (6):

These voltage signals are converted to digital signals by the touch screen controller 18. These digital signals represent each of, for instance, 256, discrete positions on the touch screen 24 in each direction. To accomplish this, for example, two 8-bit bytes are used to represent the x-coordinate, and two 8-bit bytes are used to represent the y-coordinate. Thus, the digital signal representing each such touch constitutes a coordinate set having the following format:

Detailed Description Text (26):

To better appreciate the phantom keyboard K1, consider FIG. 6. There, the screen 28 displays an application output, this time consisting of Testlines 1 through 25, across its full length and breadth. Displaying the simulated keyboard K as shown in FIG. 3 would obstruct the bottom half or so of the output, e.g., from Testline 15 through Testline 25. With renewed reference to FIG. 3, it is apparent that the phantom keyboard K1 eliminates this problem by displaying both the entire output screen and the simulated keyboard superimposed, one over the other. By controlling the relative intensities, a user can readily distinguish, e.g., the key frames and identifying indicia from the text of the output screen. In fact, it has been found that the relative intensities can be factory set, and yet provide for readable screens for most users. On the other hand, a user adjust can be provided, preferably a touch-sensitive scale on the OPTION screen.

## CLAIMS:

2. The computer of claim 1 further comprising means for adjusting the display time ratio.
6. The computer in accordance with claim 5,
  - A. wherein, in association with a pre-selected period of time during which said simulated keyboard continues to be touched, said control means generates an electrical signal corresponding to a character;
  - B. wherein said processor receives said electrical signal, and causes said character to be displayed on said touch-sensitive display in response thereto, and
  - C. said computer further comprises first user-actuated means coupled with said processor for adjusting auto-repeat delay, i.e., the length of said period of time

**WEST****End of Result Set**

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L5: Entry 1 of 1

File: USPT

Dec 3, 1996

DOCUMENT-IDENTIFIER: US 5581243 A

TITLE: Method and apparatus for displaying simulated keyboards on touch-sensitive displays

US PATENT NO. (1):  
5581243Abstract Text (1):

A phantom keyboard is formed on a touch sensitive display as an input tool for a computer. The keyboard is superimposed on, though does not occlude from view, an image of an output of an application being run on the computer. In a another aspect of the invention, the simulated keyboard is displayed in a different fashion, in a window occupying, e.g., the bottom of the display raster, while the application's output appears in a window occupying, e.g., the top of the display raster. Since this arrangement provides only a fraction of the full raster for displaying the output from the application program, a special scroll feature is provided. This feature permits the user to scroll through the full screen page of text, but without the text of any other screen pages appearing on the display. In yet another aspect of the invention, the key "auto-repeat delay" and "auto repeat rate" of the simulated keyboard are user adjustable, again preferably by an adjust appearing on the touch-sensitive display.

Brief Summary Text (17):

This novel effect is produced by generating the keyboard and output images in alternation and controlling the "generation" time and/or "off" time of each. Using a liquid crystal display ("LCD"), it has been found that painting the keyboard image on the display for about 60 milliseconds, and then painting the output image for 120 milliseconds before again painting the keyboard image, produces the desired visual effect.

Brief Summary Text (19):

LCD's are believed particularly advantageous in producing the phantom keyboard since light emitted from the liquid crystals tends to "linger", while the on/off radiation response of, e.g., cathode ray tubes is quicker. That plus the short duration between the times that the phantom keyboard is painted, fools the "eye" of the user into believing the keyboard is continuously (or, at least, substantially continuously) being displayed.

Brief Summary Text (25):

In yet another aspect of the invention, the key "auto-repeat delay" and "auto repeat rate" of the simulated keyboard are user adjustable, again preferably by an adjust appearing on the touch-sensitive display. The auto-repeat delay is a measure of the length of time a key can continue to be touched after a first electrical signal is generated and before it generates a second electrical signal corresponding to the character or function represented by that key. Put another way, the auto-repeat delay for a character key, for example, can be thought of as the length of time between the display of the character corresponding to that key, and a repetition on the display of that character. On the other hand, the auto-repeat rate is a measure of the rate at which a successive repetition (third, fourth, etc.) of that character will appear on the screen.